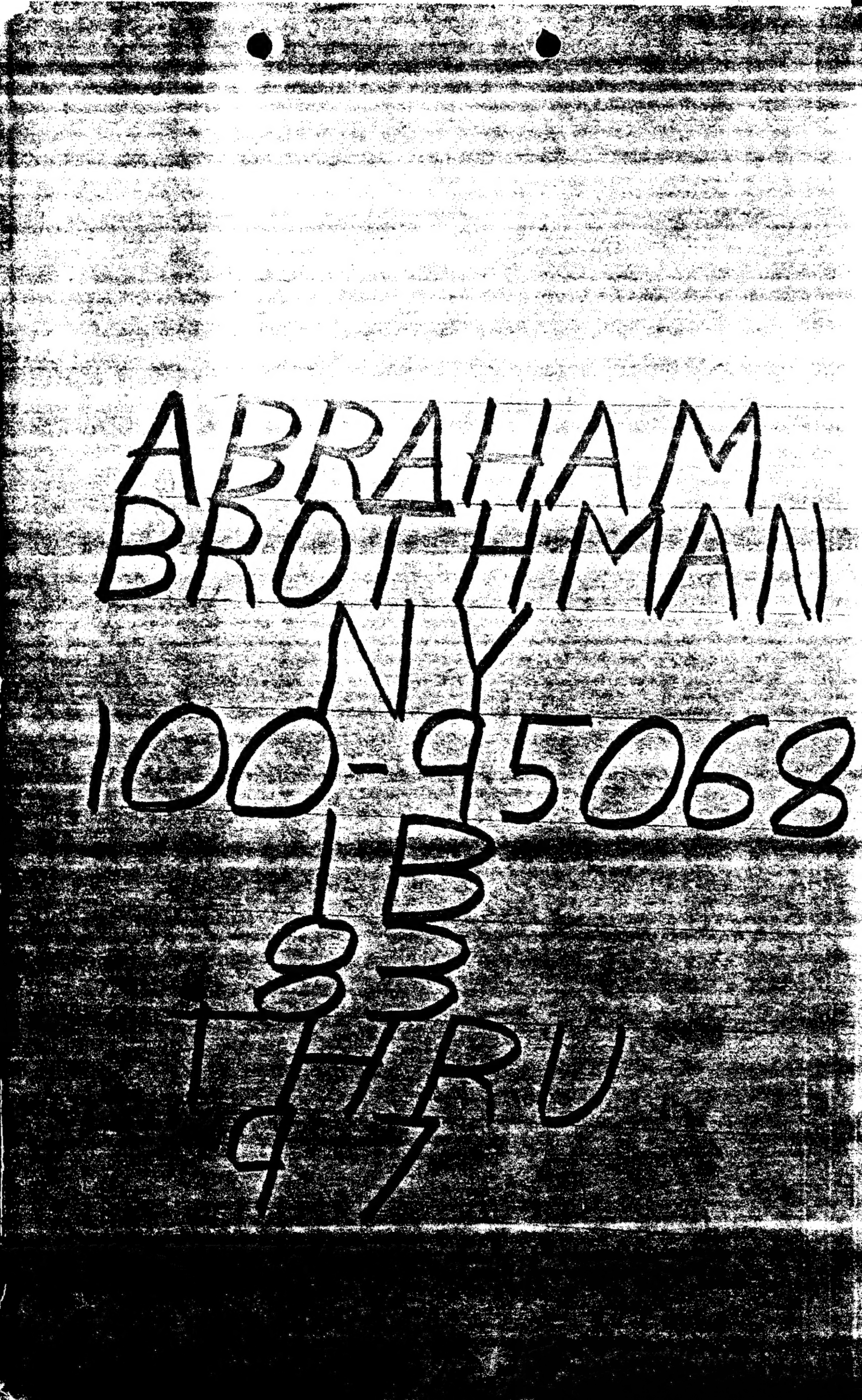

ABRAHAM
BROTHMAN
NY
100-95068
33
THRU

JULIUS ROSENBERG, et al.

NEW YORK BULKY EXHIBIT FILES

G. Brothman

100-95068 1383-97

Exhibit Number	Description	Released	Denied	Withheld
83	Data Sheet			destroyed
84	Bulletin			✓
85	Mag. article			✓
86	Mag. article			✓
87	Mag. article			✓
88	Photos	✓		
89	Photos	✓		
90	Photos	✓		
91	Photos	✓		
92	Photos	✓		
93	Saypol's Statement			✓ destroyed
94	MEMO			✓
95	Saypol's Summation			✓
96	Article Summaries	✓		
97	Report	✓		

FD-141
(7-1-48)

BULKY EXHIBIT

Date received 11/4/50

ABRAHAM BROTHMAN

100-95068-1B
(Title of case)

Submitted by Special Agent JOSEPH J. FALGUTA

Source from which obtained ROBERT K. TOMSEN

Address 42 Prospect Ave. Sea Cliff, NY

Purpose for which acquired Evidence

Location of bulky exhibit IN CABINET 61TH FILE

Estimated date of disposition TO BE DECIDED AT CONCLUSION OF CASE

Ultimate disposition to be made of exhibit RETAIN

List of contents:

83. Copy of Typical Data Sheet on Hendrick Mixers.
84. Bulletin on "Alkyd Resin Plant Design".
85. Reprint of article from 12/41 issue of Chemical & Metallurgical Engineering on "Design of a Urea Resin Plant".
86. Reprint of article from 6/45 issue of Chemical and Metallurgical Engineering entitled, "Continuous Mixing and Reaction Equipment Design".
87. Reprint of article on "New Approach to Continuous Reactor Design".

Destroyed 2/13/52 Collins

(49)
100-95068-1B

FD-141
(7-1-48)

BULKY EXHIBIT

Date received 11/10/50

ABRAHAM BROTHMAN

100-95068-1B

(Title of case)

Submitted by Special Agent JOHN F. COLLINS

Source from which obtained Photo Lab.

Address N.Y. Office

Purpose for which acquired Evidence

Location of bulky exhibit IN CABINET WITH FILE

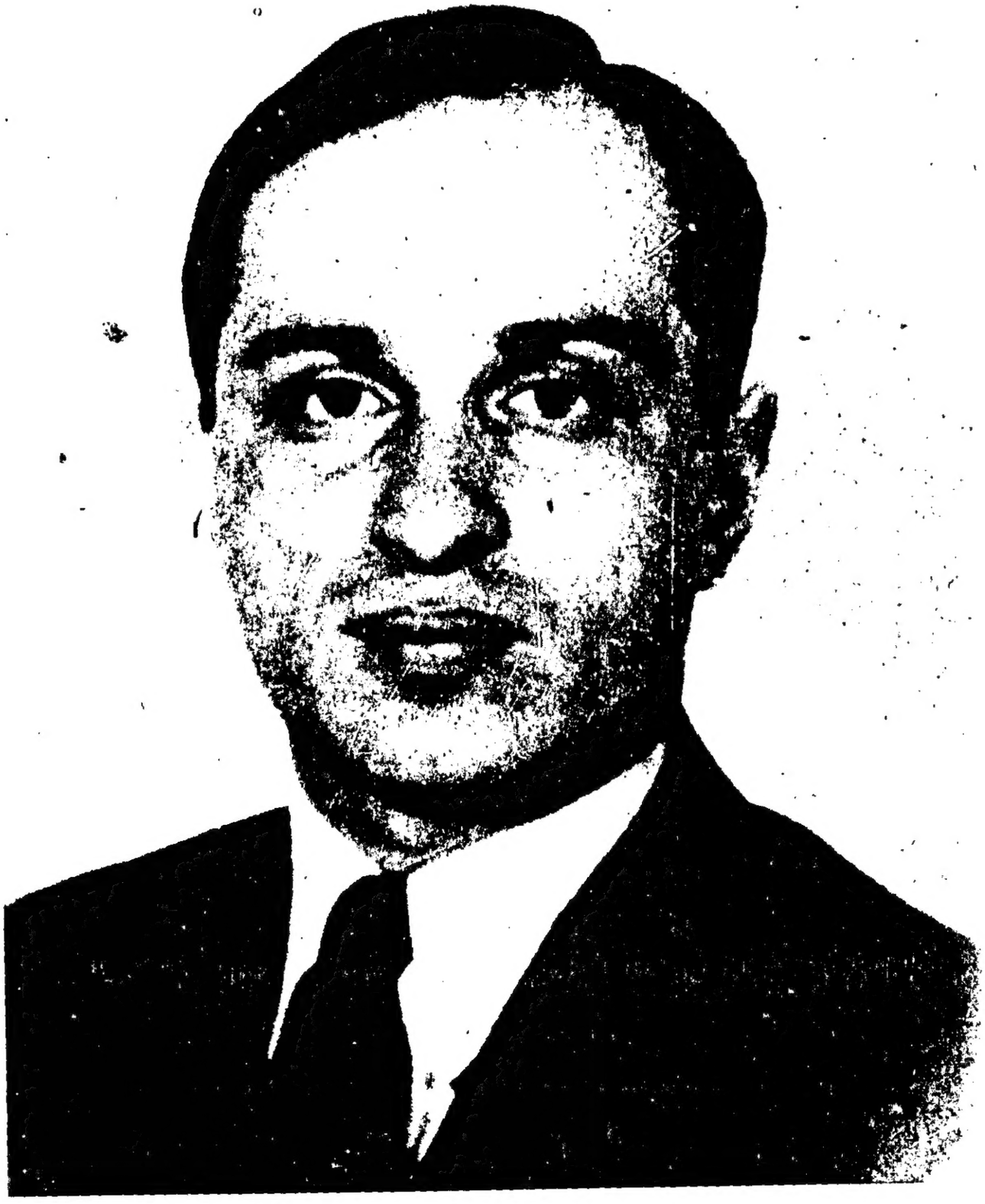
Estimated date of disposition TO BE DECIDED AT CONCLUSION OF CASE

Ultimate disposition to be made of exhibit RETAIN

List of contents:

88. Three Large Photographs of Abraham Brothman.
89. Two Large photographs of Jean Zawyrucka
90. ~~Two~~ Large photographs of Jacob Golos
91. Two Large photographs of Semen Semenov
92. Two Large photographs of Harry Gold
Negatives for above.

100-95068



FD-141
(7-1-48)

BULKY EXHIBIT

Date received 11/13/50

ABRAHAM BERTHAM

100-95068-1B
(Title of case)

Submitted by Special Agent JOHN M. COLLINS

Source from which obtained See Serial 560

Address

Purpose for which acquired INVESTIGATION

Location of bulky exhibit IN CABINET WITH FILE

Estimated date of disposition TO BE DECIDED AT CONCLUSION OF CASE

Ultimate disposition to be made of exhibit RETAIN

List of contents:

+ 93. Photostatic copy of opening statement of U.S. Attorney Irving Saypol.
+ 94. Photostatic copy of Government reply memorandum to defendants' motion to dismiss Counts 1 & 2 of the indictment in case.

+ Destroyed 9/25/54 (CD)

(51)
100-95068-1B

FD-141
(7-1-48)

BULEY EXHIBIT

Date received 11/22/60

ABRAHAM BROTHMAN

100-95068-1B
(Title of case)

Submitted by Special Agent JOHN M. COLLINS

Source from which obtained U.S.A. Irving H. Saypol

Address

Purpose for which acquired INVESTIGATION

Location of bulky exhibit IN CABINET WITH FILE

Estimated date of disposition TO BE DECIDED AT CONCLUSION OF CASE

Ultimate disposition to be made of exhibit RETURN

List of contents:

95.: Copy of summation of U.S.A. Saypol.

Destroyed
9/25/67

(52)
100-95068-1B

FD-141
(7-1-48)

BULKY EXHIBIT

Date received 11/13/50

ABRAHAM BROTMAN

100-95068-1B
(Title of case)

Submitted by Special Agent JOHN M. COLLINS

Source from which obtained

Address

Purpose for which acquired INVESTIGATION

Location of bulky exhibit IN CABINET WITH FILE

Estimated date of disposition TO BE DECIDED AT CONCLUSION OF CASE

Ultimate disposition to be made of exhibit RETAIN

List of contents:

96. English summaries of articles copied by SA B.S. Taylor from "Bulletin de L'Academie Des Sciences de l' USSR, Serie Physique "at N.Y. Public Library.

(53)
100-95068-1B

Izvestia
ИЗВЕСТИЯ
Academy of Science USSR
АКАДЕМИИ НАУК СССР
Series Physics
СЕРИЯ ФИЗИЧЕСКАЯ
Bulletin
De L'Académie Des Sciences De L'USSR

Série Physique

T. IV., No. 2

МОСКВА 1940 Moscow

1. Ionisation of Atoms & Pair-Creation in the Course of Nuclear Reactions.
A. B. Migdal

In cases of very nonadiabatic processes - that is in cases, when the time of interaction is small as compared with atomic periods, the transition probabilities may be calculated quite easily. Such are the cases of ionisation & pair creation, occuring in the process of radioactive decay, nuclear collisions and fission of heavy nucleus. In these cases the ψ-function of electronic cores (or of electrons on negative levels) do not have enough time to change appreciably in the process of collision. In the final state the electrons in the field of new nucleus may turn out to be represented by the initial ψ-function over the eigenfunctions, corresponding to the new state of nucleus.

In the process of radioactive decay the probability of ionisation occuring turns out to be $W \sim \left(\frac{\Delta Z}{Z_{eff}}\right)^2$, where Z_{eff} — the effective nuclear charge for this case and ΔZ — the change of nuclear charge. For outer

1-3. Numerically W equals approximately $2 \cdot 10^{-1}$.

Physico-Technical Institute
of the Ac. of Sci. of USSR
Leningrad

2 pg Russian
1 pg English

1-2. Since Z_{eff} is very small and $W \sim 1$. For the process of nuclear collision the the transition probability has the form $\left| \int \bar{\psi}_{,e} \, i\frac{mv}{\hbar} x \, \psi_0 \, d\tau \right|^2$, where v - velocity of nucleus suffering recoil.

The probabilities of pair creation are much simpler to calculate by expanding the nuclear field in plane waves. For the collision of relativistic neutron & proton

$$W = \frac{2\pi^2 \beta^2}{9\pi^2} \lg 2E \left(\lg 2E - \frac{10}{3} \right),$$

where $\alpha = \frac{1}{137}$, $\beta = \frac{v}{c}$, v - the recoil velocity of proton, E - energy of neutron in Mc^2.

For the fission of uranium nucleus

$$W = \frac{2 Z_{eff}^2 \alpha^2 \beta_2}{9\pi^2} \lg 2E \left(\lg 2E - \frac{10}{3} \right).$$

Here $Z_{eff} = Z_1 \left(1 - \frac{2 Z_2 A_2}{Z_1 A_1} \right)$, $\beta = \frac{v}{c}$; v and E - the velocity and energy of the smaller fragment. A_1, A_2, Z_1, and Z_2 - atomic weights and numbers of fragments.

3 N.A. Perfilov

Observation of Tracks of Recoiling Nuclei Arising in the Course of Uranium Fission Under the Neutron Bombardment in the Wilson Chamber Working Under Lowered Pressure.

Recoiling nuclei arising in the course of uranium fission due to neutron bombardment were observed in the Wilson chamber at the pressure of 250 mm Hg. 10000 stereoscopic photos were obtained, revealing some tracks of uranium fission products, which differ greatly from that of α particles, as regards the density of ionisation. This suggests that they have larger charge. The examination led also to the determination of several tracks. In one of these cases, the angular relation leave no possibility to ascribe it to the elastic impact of a particle with the atom of O2. The scanning experiments, undertaken in order to clarify the possibility of observation of further fission fragments, gave negative results. However the experimental conditions were not identical with those when the first was obtained, because the fission products,

2 A. I. Lerpunsky - Fission of the Nuclei

The paper surveys the history and the present state of the question. Brief account of the Bohr + Wheeler theory is given. Values of cross-section of uranium fission found by different authors as well as their dependence on neutron energy are analysed. Various methods of getting fission are mentioned. The output of neutrons in the course of fission is discussed, especially carefully in connection with the problem of obtaining chain-reaction. The possibility of obtaining such chain-reaction from thermal neutrons in uranium-water mixtures is considered as doubtful. At times experimental data obtained in the authors lab. are made use of.

Ukrainian Physico-Technical Institute
Kharkov

8 pgs Russian
10 lines Eng

4. K.A. Petrzhak
Ranges and Energies of Fragments of Uranium Fission caused by Fast Neutrons

The process of uranium fission due to capture of fast neutrons was investigated by means of ionisation chamber, connected with proportional amplifier of the Wynn-Williams type. 2 groups of fragments having energies 60 + 85 MeV were determined.

Precise determination of uranium fragments ranges was also fulfilled. It was stated that the uranium fission leads in general to two sharp groups of fragments having ranges of 14 and 20 mm of air. The intensity of the group with greater range exceeds that of the other by 20-25%. This may be explained by the supposition that besides the main process of fission leading to two fragments having greatly different masses, there also takes place the fission, which gives fragments with nearly equal masses.

The slowing down, that is, the energy loss for the ionisation are suffered by

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3-2: accumulated on the thin sheet of paper were investigated every 15 minutes after they have been withdrawn from the bombarded uranium. The experiment was effected also in order to determine the possibility of uranium fission shortly after its irradiation by neutrons; this experiment also giving a negative result.

Apparently word for word.

5 V. G. Khlopin Chemical Nature of Uranium Fission Products

3 schemes of the primary fission of uranium proposed thus far:

$U_{92} \rightarrow Rb_{37} + Cs_{55}$; $U_{92} \rightarrow Sr_{38} + Xe_{54}$; $U_{92} \rightarrow Kr_{36} + Ba_{56}$

Do not allow the explanation of the presence among the uranium products of several elements, namely of tellurium, iodine, and antimony. The latter were identified and studied by Abelson Butcher and the present author. Consequently, the number of primary schemes should be increased. However we succeed in proving that Kr and Xe should not be considered primary products, or at any rate, there exists a fission scheme in which Kr and Xe appear only as intermediate products. Recently we performed another experiment which showed that the heavy metals, forming unvolatile sulfid compounds, i.e., the nuclei of Se and Te, are the primary products.

Radium Inst. 4 pg Russ
1/2 pg Eng.

fragments was also measured. From these experiments the conclusion is deduced that the lower limit of effective charge for the first one of fragments at is about 12. This quantity agrees with theoretical value, given by A. Migdal.

Radium Institute
of the Ac. of Sc. of USSR
Leningrad.

3½ pg. Russ.
1/3 page Engl

7. V. Dementy + D. Timoshchuk · Absorption of Fast Neutrons

In order to determine the absorption cross sections for fast neutrons, the targets of cylindrical shape made of elements under investigation were bombarded by neutrons from 200 mg (Ra + Be)-source. After irradiation, the induced activities were measured by Geiger - Müller counters, calibrated by means of uranium standard. The number of neutrons emitted by the source per sec. as determined by Fermi-method, was $4 \cdot 10^6$. To determine the number of neutrons, falling on targets, the activities of aluminum targets of cylindrical and plate shapes were compared with each other. For the each case (plate shape) this number was determined by means of geometrical relations. The resulting data show (see the table) that the cross-section for (n, γ)-reaction apparently caused by slow neutrons emitted simultaneously by the source, increases with the atomic number. Cross-sections for (n, α)- and (n, p)-reactions

6. G. N. Flerov + L. I. Rusinov - Experiments on Fission of Uranium

The experimental evidences are given which show that the fission of uranium, caused by thermal neutrons is accompained by the emission of secondary neutrons from 2 to 4 per one act of fission. Using the method of self-absorption of resonance neutrons in uranium, it is shown that the resonance neutrons do not lead to fission, this fact being in accordance with the hypothesis of N. Bohr that only the isotope U_{92}^{235} suffers fission under the action of thermal neutrons

Physico-Tech. Inst.
of the Ac. of Sci. of USSR
Leningrad

4 pp. figs Russian
7 lines Eng

T.A. Goloborodko & B.I. Lepunsky
Scattering of Photo-Neutrons of Different
Energies by Atomic Nuclei

Scattering of photo-neutrons from deuterium and beryllium irradiated by γ-rays of RaTh (mean values of neutrons energies 210 ± 30 keV and 800 ± 40 keV correspondingly) was studied. Photoneutrons after transmission thru material under investigation were slowed down to thermal velocities and then struck on the disprosium detector. The detector was modulated until the saturation was reached. The data obtained are given in the Table 1. Here for the comparison, the figures found with photoneutrons of (Ra + Be) are given also.

Ukrainian
Physico-Tech. Inst. Kharkov

2 pages — Russ.
6 lines — Eng.

caused only by the small fraction of the whole number of neutrons having large energies, should be considered underrated from 5 to 10 times. The data obtained show that for fast neutrons the absorption cross-sections for light nuclei are comparable with scattering cross-sections.

Ukrainian
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Kharkov

1 1/2 in Russian
1/2 — English

9-v which amplified the ionising action of electrons. In these conditions, the cyclotron gave the neutron radiation equivalent to that of 3,5 kg of radium with beryllium. The analysis of the mechanism of the operation of chamber show that the deutons arising here have comparatively low mean energies, and therefore such conditions are not favorable when working with heavy nucleus.

Radium Inst.
of Ac. of Sci. of USSR
Leningrad

3½ pg. - Russian
½ pg - Eng

9 I. V. Kurchatov
ON The Operation of the RIAN (Radium Institute of the Academy of Sciences of the USSR) Cyclotron

The cyclotron in operation was investigated with the diameters of dees 34 cm, heights — 2 cm and their mutual distance 2 cm without any special source of ions. The necessary ionisation was supplied by the glow discharge, arising between the dees. If the pressure of deuterium is $3-5 \cdot 10^{-4}$ mm Hg, the deutons are generated along the whole slit. When spiralling along their trajectories, they lead to a very intensive neutron radiation due to interaction with the absorbed deuterium and carbon on the dee surfaces. The intensity of neutron radiation with the upper energy limit 2,3 MeV was equivalent to radiation arising from 1 kg of radium mixed with beryllium. The further increase of intensity was gained, when the targets made of light elements were introduced into the chamber with deuterium pressure slightly lowered. In this case the stable discharge between dees was secured by additional constant potential difference of 10-20 kV, applied to dees,

10 K.D. Sinelnikov, A.K. Volter, A.V. Ivanov.
Calorimetric - Measurements of the Radiative Energy Losses for fast Electrons in the Lead

The paper describes the method of measuring radiative losses based on the comparison of the heating of two calorimeters (made of lithium + lead) by a monochromatic electronic beam (energy 1-2 MeV) alternatively falling on each of the calorimeters.

The values of radiative losses in lead obtained within the limits of errors of the observations coincide ~~calculated~~ with those, calculated according to the theory by Bethe and Heitler.

5 pgs writing + pictures in Russian
7 lines in English

11 L.A. ARCIMOVICH + M. BREDOV ©
The "Bremsstrahlung" of Fast Electrons

In order to get direct data concerning the cross section for the elementary process of the "B.", the passage of electrons with energies 1 or 2 MeV thru thin layers of Al, Cu, Sn and Pb (thicknesses 5.4; 33; 22 and 15 mg/cm² respectively) was investigated. The beam of electrons was focused by a double focusing spectrograph with a longitudinal magnetic field. After passage thru the target under investigation, it was absorbed in a 1,5 cm graphite block. Behind the paraffin, the Geiger - Müller counter was placed, which registered the "B". The measurements have shown that the relation of the effective cross-section for "B." to the square of the atomic number have the same value for all elements investigated, within the limits of statistical error, the latter being 10%.

The relation of the intensities of radiation for the cases of energies

12. The Scattering of fast electrons by Nitrogen Nucleus

By M.D. Bonsor, V.P. Bravlovsky and A. I Leipunsky.

The scattering of fast electrons in nitrogen was investigated using the automatically acting cloud chamber. Nearly 1000 stereoscopic photos were taken. About 300 meters of tracks were investigated by the method of cancelling tracks projection of the revolving mirror. All photos were also examined by means of stereoscope. The measurements were effected separately for 2 groups of electrons with energies of 280 ÷ 1360 kz V and 1360 ÷ 2250 kz V. As the source of electrons radium (5 mg) was used. The observed number of electrons, scattered at different angles, coincides approx. with that predicted theoretically (see Tables 1 + 2)

2 pgs.
Russian (incl. tables)
10 lines Eng.

2 MeV and 1 MeV turns out to be 1,95 (18-2) for aluminium and 2,3 for lead the accuracy being 15%. Theoretical value of this relation, according to Bethe and Heitler, is 2,05 for both elements. The dependence of intensity of radiation on the thickness of targets was also investigated. It was found that it has maximum in case of 1 MeV electrons at thickness 227 mg/cm² for lead and 510 mg/cm² for copper, and in case of 2 MeV electrons — at 620 mg/cm² for copper. All data have shown that theory and experiments are in good accordance.

2 1/2 pages in Russian

1/2 page Eng Summ.

of this data with the mean values of these angles, previously obtained for pair creation in Krypton shows, that all these angles slightly increase when the atomic number increases. With this and of the data concerning the energies and the angles, the momenta adopted by the nucleus in those vicinity the pair creation takes place were calculated for every pair. Almost in all cases this momentum lies between 0,5 and 2,5 mc.

The comparison of the number of Compton electrons from accepted pairs with the number of line of ThC" radiation permitted to determine the cross section for the process of pair creation in nitrogen. It turned out to be equal $1 \cdot 10^{-26}$ cm², which does not contradict the theoretical value. The comparison of cross section with that previously obtained for krypton shows that it varies as the square of atomic number of matter.

Physical Institute
Acad. of Sci. of USSR
Moscow

2 1/2 pgs Illus.
1/2 pg Engl.

13. L. V. Groshev

The Pair Creation in Nitrogen by Gamma-Rays

In the present work the creation of pairs in nitrogen, due to action of gamma rays of ThC" was investigated. Otest 6300 stereoscopic photo were taken, revealing 99 pairs. For 68 pairs the energy was measured. The distribution of pairs against the total energy shows a sharp maximum which lies near 1600 keV. This corresponds to pairs created by the principal ThC" line ($h\nu$ = 2.62 keV). The mean energy for positrons is about 60 keV larger than for negative electrons. Using the stereocomparator the following elements of the pairs were measured: 1) angle χ between the directions of propagation of photon + positron; 2) angle φ between those of photon and electron; 3) angle φ between those of electron + positron. The curves, showing the distributions of each of these angles are given. The following mean values of these angles are obtained: $\chi = 23°$; $\varphi = 24°$; $\Phi = 39°$. The comparison

FD-141
(7-1-48)

BULKY EXHIBIT

Date received 11/15/50

ABRAHAM BROTHMAN

100-95068-1B
(Title of case)

Submitted by Special Agent JOHN M. COLLINS

Source from which obtained Felix Gluck

Address 27 West 72nd Street, New York City

Purpose for which acquired INVESTIGATION

Location of bulky exhibit IN CABINET WITH FILE

Estimated date of disposition TO BE DECIDED AT CONCLUSION OF CASE

Ultimate disposition to be made of exhibit RETAIN

List of contents:

97. Photostatic copy of report made by Harry Gold and Morrell E. Dougherty for B & G Interstate Products Inc. Paterson, New Jersey.

(54)
100-95068-1B

REPORT TO
B. & G.
INTERSTATE PRODUCTS, IN

PATERSON, N.J.

UTILIZATION OF THE FACILITIES OF THE

B. AND G. INTERSTATE CORPORATION

1. <u>For the Production of Ethyl Alcohol</u>

There is at present a great demand by the Government for industrial alcohol; some 650 million gallons will be produced in 1944 and even this quantity will be about 50 million short of what is desired.

Before, however, the B. and G. Interstate Corporation can convert its present facilities to the manufacture of alcohol, these questions must be answered:

A. Is it physically possible to convert?

B. What would be the cost?

C. Is it economically feasible to convert?

D. Would the Alcohol and Solvents Division of the W.P.B. allow it?

E. Could the slop disposal problem be overcome?

A. The flow diagram on page 3 shows the equipment which would be needed.

For the molasses storage tanks, "1", the four 10,000 gallon wood tanks, which are set parallel to the floor on their longest dimension, could be used. These would give

$40{,}000 \times 12 = 480{,}000$ lbs. molasses of 85° Brix (% Solids as Sucros)

and

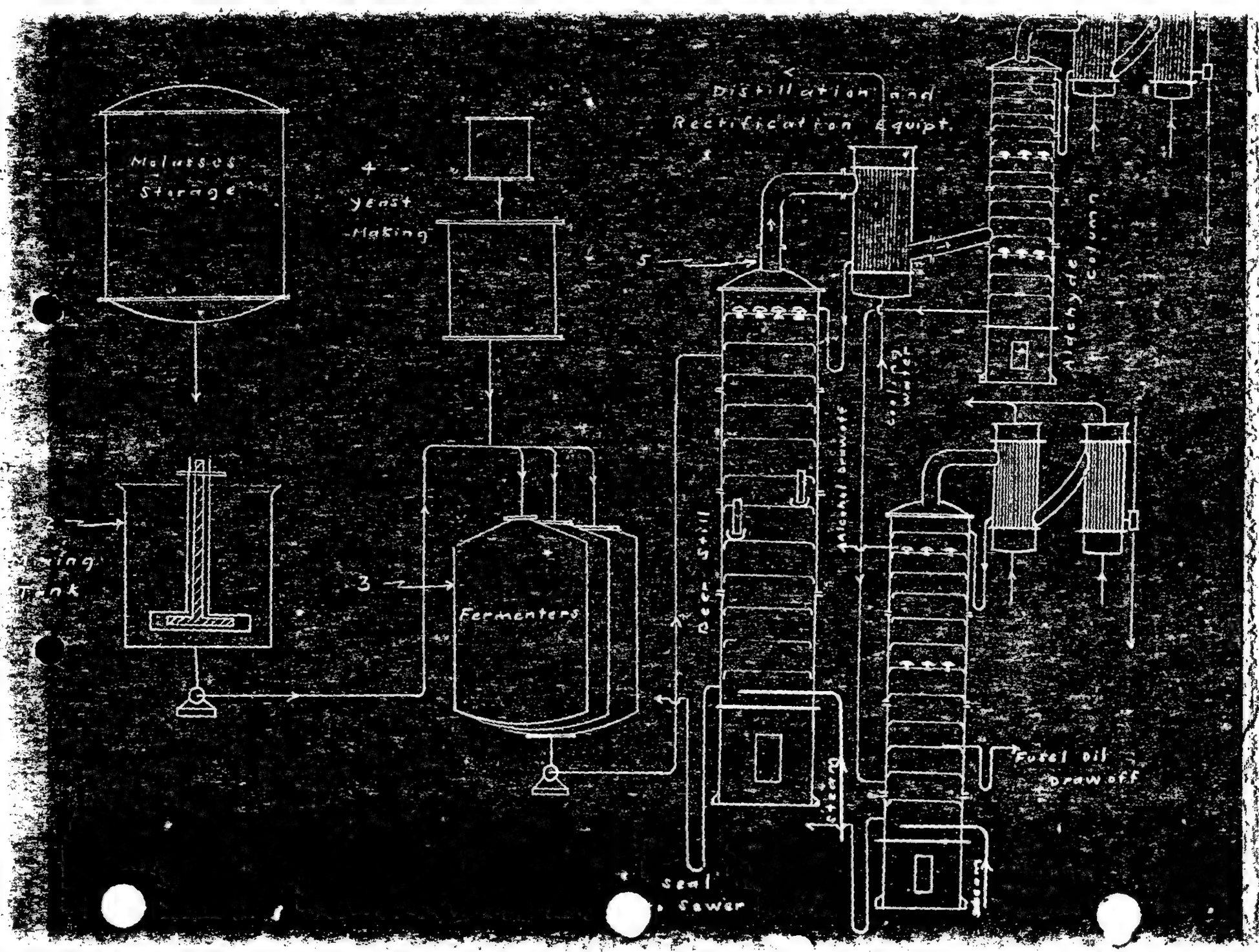
$$\frac{480{,}000}{1.99} = 243{,}000 \text{ gallons of a mash of } 18^\circ \text{ Brix.}$$

Based on the total proposed fermenting capacity of 60,000 gallons (30,000 gallons per 24 hours), these tanks would hold

$$\frac{243{,}000}{30{,}000} = 8 \text{ days supply of molasses (say a week's supply)}$$

The molasses would have to be brought to the plant in tank cars (of 9,000 gallons capacity each) since no water shipping facilities are available.

The mixing equipment, "2", is well taken care of by the 8,000 gallon tank with its turbine type agitator and heating coils (which will be used for pasteurization of the molasses to destroy most of the bacteria).


Distillation and
Rectification Equipt.
Molasses
Storage
4
yeast
Making
5
Fermenters
3
Mixing
Tank
Seal
Sewer
Fusel oil
Draw off

A summary of the capacity of the fermenters, "3", gives

2 x 10,000 gal. wood tanks	= 20,000 gals.
2 x 9,000 gal. wood tanks	= 18,000 gals.
2 x 8,000 gal. wood tanks	= 16,000 gals.
1 x 12,000 gal. copper kettle	= 12,000 gals.
Total . .	=66,000 gals.

These are ideal for fermentation as they contain coils for heating and cooling; the only difficulty is that, being of wood, good care would have to be taken to keep them clean. Allowing 10% for head space, this gives 60,000 gallons of fermentation capacity. On the basis of a 48 hour fermentation cycle, 30,000 gallons would be fermented per day (to allow for changeover time and occasional slowness of fermentation, it would be advisable to have an extra tank of 10,000 gallon capacity).

The Yeast making equipment, "4", will require:

3 x 500 = 1500 gals. total / 24 hours.

and for the total fermenting capacity at least two such tanks, plus two smaller ones of 200-300 gallons each, would be required. Provision would have to be made to sterilize the wort for the yeast tubs at 10 lbs. for 30 minutes; this could easily be done in the two 3,500 gallon pressure cookers which are available and these would serve very well as the two main yeast tubs--the two smaller tanks can be supplied from several such around the plant.

There are plenty of pumps of all the types needed--centrifugal, steam and displacement-- and there is a sufficient supply of cooling water (20,000 g.p.h. from an artesian well.)

We now come to the distillation and rectification equipment, "5", the following are required:

a 30" diameter, 20 plate Beer Still,
a 24" diameter, 25 plate Aldehyde Column,
a 24" diameter, 40 plate Rectifying Column,
a Periodic (batch) Fusel Oil Column.

B. The total cost of the above would be about $50,000. If to this is added the cost of piping and the alcohol receiving tanks an additional $12,000 would be needed, and the alcohol storage and denaturing facilities (scale tanks and storage tanks for denaturants) will run another $25,000. The cellars will provide ample such space.

At an average of 9% by volume of alcohol in the fermented mash ("Beer"), there would be produced

$30{,}000 \times 0.09 \times 7 = 19{,}000$ gals. / week of absolute alcohol

or

$19{,}000 \times \frac{200}{190} = 20{,}000$ gals. / week of 190° proof alcohol.

C. We do not, however, believe that it is economically feasible for such a plant to go into the production of ethyl alcohol, particularly without the recovery of by-products ($C O_2$, Yeast). With molasses at 18 cents / gallon (2.68 cents / lb. of Invert Sugar), the cost of the raw materials per gallon of 190° proof alcohol is about 40 cents, adding 15% for labor, steam and power, this raises the cost to 46 cents and the price of alcohol is rigidly fixed at 48 cents per gallon. This margin is too small to work on and even at that does not take depreciation and maintenance into account.

On even a close study of the above figures they do not make sense, but the fact is that the present cost of molasses is inflated nearly 400% above pre-war prices--molasses formerly sold for 4 cents to 6 cents / gallon, and the price of alcohol has risen only from 35 cents to 48 cents, an increase of only 37%.

Also it must be borne in mind that many distilleries are operating on both grain and molasses, and since the grain is used on a cost-plus Government subsidy basis, the distillers conveniently shift all molasses operating expenses over to the grain in their accounting.

All of the smaller distilleries (i.e., under 100,000 gallons / day mashing capacity) are making their alcohol from grain at the Government's expense! Most of them were beverage (whisky) distillers before the war and will go back to this highly profitable business after the war. But under ordinary conditions industrial alcohol made from grain cannot compete with that made from molasses because of the difference in the cost of the raw materials.

D. Further, actual conversation with officials high in the Alcohol and Solvents Unit of the W.P.B. and with men in the Alcohol Tax Unit of the Treasury Department has brought out the following facts against the possibility of Government permission to convert the B. and G. plant to the production of ethyl alcohol:

1. It would require the presence of at least [illegible] Internal Revenue Gaugers on the premises at a time [illegible] there are not enough to go around as is.

2. Even if the necessary priorities on critical materials are granted, it is doubtful whether the manufacturers could supply the equipment much before 9 months.

3. The Government, looking forward to a post-war economic set-up, does not favor any further expansion of the already swollen facilities for the production of ethyl alcohol.

E. In addition, the location of the present plant raises a serious difficulty in the disposal of distillery "slop", the material remaining after the alcohol has been removed from the fermented mash. Nearly all present distilleries, if not all, are located near a river, harbor, or small stream which helps in this disposal. But, immediately before the war, practically every community had passed, or had in the process of passing, legislation forbidding the pollution of these waters by the slop--it was only because of the emergency need for alcohol and also because of the shortage of critical materials for the manufacture of slop disposal equipment, that the enforcement of these laws has been sidetricked for the duration.

Extensive research has been and is now being conducted by all of the larger distilleries with this post-war disposal problem in view--the present location of the B. and G. does not involve any pollution problem, but it does mean that the cost of handling (transportation in tank trucks) would be an expensive matter.

* * *

Conclusion: We do not recommend the conversion of the B.and G. Interstate Corporation plant to the manufacture of ethyl alcohol.

There is, however, a distinct possibility that with the available facilities that the following program might be put into effect.

2. Production of a Feed Yeast from Citrus Molasses.

The sugar in molasses can be used for two purposes: to produce alcohol and only enough yeast for the fermentation, or to produce the maximum amount of yeast and very little alcohol (1% by volume).

We have done a great deal of work in the past two years on the manufacture of a feed yeast from molasses. From personally conducted experiments on a new type of molasses (citrus) and using a specially developed yeast culture, we have produced a very high grade of feed yeast. This citrus molasses is the concentrate from the residue after the juices have been removed from citrus fruits. As compared with ordinary (blackstrap) molasses it yields a yeast of the following composition:

	Citrus Molasses Yeast	Blackstrap Molasses Yeast
Protein, %	53%	38%
Ash, %	10%	7%
Vitamin B_2 (Riboflavin) γ/gm.	80	27
Vitamin Pantothenic Acid, γ/gm.	250	100
Vitamin Niacin, γ/gm.	350	150

Further, because of the original oils present, it probably contains a high proportion of Vitamins C and D.

Blackstrap molasses yeast sells for 11 cents / lb. (dry) and the citrus molasses yeast could undoubtedly be sold at a premium for as high as 15 cents / lb. In this country it would be sold as a very high grade and most urgently needed feed for poultry and livestock. It undoubtedly could be used for human consumption (directly, or mixed in bread and various grains) in countries where the available protein is very low and where acute vitamin deficiencies and malnutrition exist (China, India, parts of Europe, and even Great Britain). As far back as 1941, the British Purchasing Commission offered to buy from a U.S. Distillery 40 tons / day of the blackstrap molasses yeast---this offer had to be turned down as the yeast was recovered purely as a by-product and the U.S.Government would allow no molasses to be used for making yeast alone. Now, of course, all molasses derived from sugar cane is under a still more stringent regulation. The citrus molasses, however, is a new development and its sale is not restricted. At present it is available in sufficient quantity. The cost is below 18 cents / gallon of 72° Brix. From this 3 lbs. of dried yeast at 15 cents / lb. could be produced, or a total value of product of 45 cents. Even assuming a 50% (of raw material) production cost, it can be seen that the profit is tremendous.

We have complete data for the setting up of a plant for the manufacture of this yeast.

Since we did not wish to delay this report any further, we have not mentioned several other projects to which we believe your plant could also be adapted.

Harry Gold

Morrell E. Douglas